

REVIEW OF THE CARIBBEAN *GERON* MEIGEN (DIPTERA: BOMBYLIIDAE)

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Abstract.—Seven new species plus one previously known species of *Geron* Meigen are reported from the northern and central Caribbean Islands. *Geron insularis* Bigot is synonymized with *G. senilis* (F.). *Geron senilis* is redescribed from new material and a lectotype is designated for the species. New species are described, illustrations of significant characters and a key to the species are included.

Geron senilis (Fabricius) and *G. insularis* (Bigot) are the only species of *Geron* Meigen reported from the Caribbean Islands (Painter et al., 1978). Unfortunately, descriptions of the 2 species (Fabricius, 1794; Wiedemann, 1828; Bigot, 1857) are brief, and lack adequate characters to separate the species (Painter, 1932). Recently Painter and Painter (1962) located 3 specimens of *G. senilis* in the Lund and Sehestedt collection in Denmark (these are part of the Fabrician syntype series; L. Lyneborg, pers. comm.) but did not clarify the status of the species. They also located the Bigot syntype series of *G. insularis* in the Paris Museum, selected a male lectotype (labeled "*Bombylius insularis*, type, Cuba") and a female lectoallotype (labeled #242, ♀), and gave a redescription of the species. However, the redescription lacks sufficient characters to separate *G. insularis* from *G. senilis* or other species in the Caribbean Islands.

To resolve the problem, we studied the 5 Fabrician syntypes of *G. senilis* and the lectotype of *G. insularis*. Loïc Matile of the Paris Museum removed the male genitalia from the male lectotype of *G. insularis* and sent it to us for examination.

Of the 5 syntypes of *G. senilis*, the one in the Kieler collection is badly damaged and is of no value in determining the species identity. The 4 syntypes (2♂♂, 2♀♀) in the Lund and Sehestedt collection are in better condition although the pile is virtually absent in 2 specimens and discolored in a third. Two males have their genitalia sufficiently exposed for comparison. One male has the genitalia expanded and the other has it closed. One male bears a handwritten label with the name "*B. senilis*," and a female has a locality label with "var. a ins. thoma."

Comparison of the 2 male syntypes of *G. senilis* clearly shows them to be the same species. The male, with the expanded genitalia and unlabeled, has slender structures and may appear slightly underdeveloped upon initial examination. However, the genitalia of *G. senilis* are quite simple and differ significantly from those of the more robust, structurally complicated, Nearctic species. The syntype male, in the best condition with closed genitalia and the label "*B. senilis*," is designated LECTOTYPE for *G. senilis*.

We also studied a series of about 150 specimens of both sexes which were collected from the islands in the Bahamas southward to Jamaica and eastward to the Virgin Islands. The series included the female lectoallotype and the genitalia of the male lectotype of *G. insularis* and several specimens identified as *G. insularis* by Painter. We compared these specimens with the syntypes of *G. senilis* and found them to be virtually identical. We therefore conclude that the male lectotype of *G. insularis* is conspecific with the lectotype of *G. senilis*, and thus the two taxa are synonymous. However, the former lectoallotype of *G. insularis* is clearly not a female of *G. senilis*. It differs significantly in the vestiture of the head and dorsum of the thorax and abdomen to distinguish it from *G. senilis*. Since we were unable to dissect the female, a description of the species must be delayed until additional material becomes available.

While working on this problem, we found 7 new species of *Geron* Meigen from the northern and central Caribbean Islands. This study also reports these species and provides a key to the known species from this region.

KEY TO SPECIES OF *Geron* MEIGEN IN THE CARIBBEAN

1. Pile of 2nd antennal segment white ventrally 2
- Pile of 2nd antennal segment wholly black or brown 3
2. Pile of 2nd antennal segment yellowish and brown dorsally, white ventrally; apical process of gonocoxite somewhat robust (Fig. 33), aedeagus long (Fig. 34); arms of vaginal apodeme kidney-shaped apically (Fig. 32c) (Cuba) .. *G. nephroideus*, new species
- Pile of 2nd antennal segment wholly white; apical process of gonocoxite slender (Fig. 1a), aedeagus short (Fig. 1b); arms of vaginal apodeme flat and laminate apically (Bahamas, Greater Antilles) *G. senilis* (Fab.)
3. Hindfemur reddish, basal antennal segment with wholly brownish (♂) or mostly yellowish (♀) pile (Jamaica) *G. farri*, new species
- Hindfemur dark brown to blackish, basal antennal segment with variable pile 4
4. Basal antennal segment with mostly dark pile dorsally 5
- Basal antennal segment with mostly whitish or yellowish pile dorsally 7
5. Gonostylus and vertical plate fused, slightly longer than apical process (Fig. 22); gonocoxite lobed medially with several spatulate fingers (Fig. 23) (Antigua) *G. binatus*, new species
- Gonostylus and vertical plate separate, both shorter than apical process; gonocoxite not lobed medially, spatulate fingers absent 6
6. Gonostylus long and slender, articulated near base of apical process; vertical plate large with a long basal spine (Figs. 6–10) (Bahamas) *G. salmonus*, new species
- Gonostylus short, articulated near apex of vertical plate; vertical plate small with a short spine (Figs. 29–31) (Dominican Republic) *G. articulatus*, new species
7. Basal antennal segment with wholly whitish pile; vertical plate, gonostylus and apical process of gonocoxite slender and noticeably weak (Figs. 26, 27); aedeagus short, not noticeably projecting (Fig. 28) (Antigua) *G. declinatus*, new species
- Basal antennal segment usually with several dark hairs dorsally; vertical plate, gonostylus and apical process noticeably large and strong (Figs. 18–20); aedeagus long, usually projecting near tip of apical process (Fig. 19) (Bahamas, Cuba) *G. exumae*, new species

Geron senilis (Fabricius)

Figs. 1-6

Bombylius senilis Fabricius, 1794:411. Type locality, Americae Meridionalis Insularis. Lectotype ♂, Lund and Sehestedt Col., Universitetets Zoologiske Museum, Copenhagen, Denmark.

Geron senilis: Weidemann, 1828:357; Johnson, 1908:72; 1913:58; Painter, 1932: 144, 165, 166; Painter and Painter, 1962:48; Hull, 1973:204, 206; Painter et al., 1978:17.

Geron insularis (Bigot): Painter and Painter, 1962:47-48, designated ♂ lectotype, redescribed species based upon lectotype. Type locality Cuba, lectotype ♂, Paris Museum. **NEW SYNONYMY.**

Diagnosis. *Geron senilis* is easily recognized by its white oral margins; pile and hairs of head, antenna and abdomen white; front entirely and legs usually with silvery scales and hairs, ocellar hairs whitish to pale yellowish and the slender male genitalia.

Geron senilis is easily recognized from other Caribbean species by the characters of the genitalia and the white vestiture of the antenna and head. The scales and pile of the front are entirely white in females of *G. senilis*. In other species, the fronts of females have numerous yellow to golden scales and a few to several yellowish hairs.

Description. Males: Length 2.2-4.9 mm, wing 1.9-4.3 mm, proboscis 1.2-2.5 mm, front at antennal base 0.1-0.4 mm, antennal ratios 1.8:1.0:6.0 to 2.0:1.0:7.0. Ground color mostly black, oral margin whitish; apical corners of tergite 1 broadly and corners of tergites 2-4 and cercus narrowly yellowish. Gonocoxite 9 brown basally, shiny black to dark brown apically.

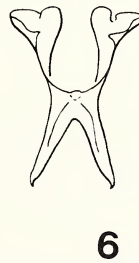
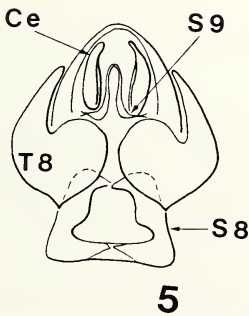
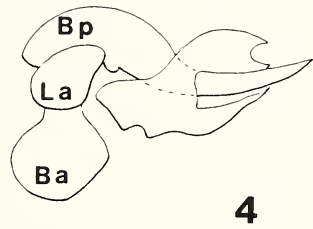
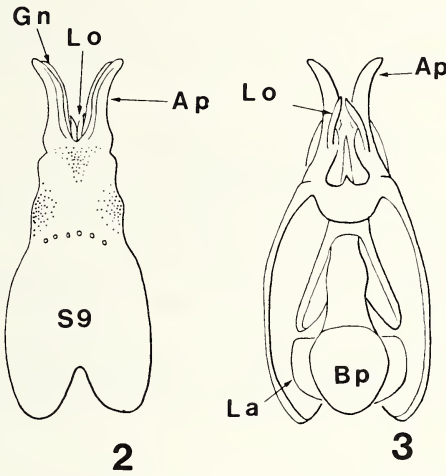
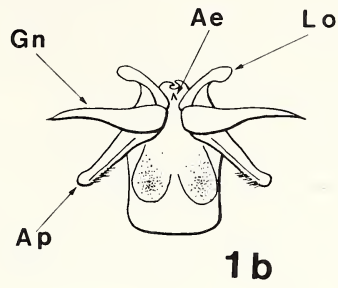
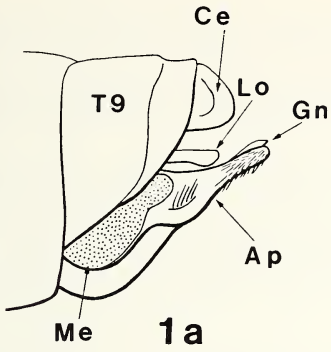
Face, front and lower ½ or more of occiput gray pollinose with white pile and silvery scales, occiput blackish brown pollinose dorsally with mostly white pile, ocellar tubercle with pale yellowish or yellowish white pile, golden scales posteriorly. Antenna grayish pollinose with basal 2 segments white pilose.

Scutum black pollinose, slightly brownish anteriorly and laterally, 2 grayish pollinose stripes anteriorly; anterior ⅓ with long, dense, white pile and mostly yellowish to silvery flat scales, posterior two-thirds with pile shorter, less dense and often pale yellow to pale yellowish brown; scales scattered, golden yellow and decumbent; a few stiff yellowish hairs laterally and posteriorly. Scutellum blackish pollinose with white pile and silvery scales, anepimeron and meron bare or nearly so.

Wing hyaline, subcostal cell slightly yellowish, veins brownish yellow, node of vein M similar in color to surrounding veins. R-m crossvein beyond middle of discal cell; vein between discal and 1st medial cells slightly sinuous to straight; anal cell closed, stalk of anal cell slightly more than length of r-m crossvein. Costal vein with white pile basally; squama and fringe white. Halter creamy white.

→

Figs. 1-6. Genitalia of *G. senilis*; 1-4 male, 5, 6 female. 1a, Closed condition, lateral view; 1b, expanded condition, apical view. 2. Gonocoxite plus sternite 9, ventral view. 3. Aedeagus and gonocoxite, dorsal view. 4. Aedeagus, lateral view. 5. Sternite 8, and lobes of tergite 8,



ventral view. 6. Vaginal apodeme, ventral view. Abbreviations: Ae = aedeagus, Ap = apical process of gonocoxite, Ba = basal ejaculatory apodeme, Bp = basal point of aedeagus, Ce = cercus, Dr = anterior arms of dorsolateral apodeme of aedeagus, Lo = lobe of gonocoxite, Me = membrane, S = sternite, Sh = sheath, Sp = spine of vertical plate, T = tergite, Vp = vertical plate.

Legs white pilose, with mostly white scales; femora sometimes with sparse brownish scales apically; spines of tibiae dark brown.

Abdomen black pollinose, with traces of brown laterally, gray ventrally, pile generally white, sometimes faintly yellowish; dorsal scales yellow and curved, silvery and flat laterally and ventrally.

Genitalia (Figs. 1-4). Gonocoxite with large oval membrane laterally and a horizontal, apically rounded, dorsal process or lobe; the apical process slender, pilose on apical half or more, and slightly convex apically. Gonostylus slender, almost as long as apical process. Aedeagus slightly undulate, narrowly connected to gonocoxite via dorsolateral ramus, base of aedeagus and basal apodeme ovate, apex short, not clearly exposed in either expanded or closed condition.

Females: Lengths 2.5-4.6 mm, wing 2.5-4.6 mm, proboscis 1.2-2.5 mm, front 0.2-0.5 mm, antennal ratio 2.2:1.0:5.8 to 2.0:1.0:6.0. Oral margin sometimes slightly yellowish, usually white; front with silvery scales and white pile; scutal dorsal stripes less defined than in males, dorsum of scutum and abdomen often brownish black pollinose.

Genitalia. Tergite 8 with oval lobes, slightly longer than wide, with 5-6 short bristles ventrally. Sternite 8 slightly longer than wide, rhomboid-shaped, weakly setaceous apically, middle membranous and bell-shaped (Fig. 5). Vaginal apodeme with dorsal arms somewhat lamellate apically (Fig. 6). Sternite 9 narrow, weakly sclerotized, extending upward between cerci basally.

Lectotype. ♂, 1♂ and 2♀♀ paralectotypes, Lund and Sehestedt Collection; 1 paralectotype (sex ?), Kieler Collection; Universitetets Zoologiske Museum, Copenhagen, Denmark.

Other specimens examined. Cuba 3♂♂, Puerto Rico 3♂♂, 3♀♀; Mona Island ♂, ♀; Virgin Islands (St. Thomas) ♀; Turks and Caicos Islands 5♂♂, 4♀♀; Jamaica 5♂♂, 5♀♀; Bahama Islands (Exuma, San Salvador, Eleuthera, Berry, North Bimini, Long) 140♂♂, 25♀♀.

Distribution. *Geron senilis* is active through its range from December to August. Its range extends from the Bahamas southward to Jamaica and eastward to the Virgin Islands.

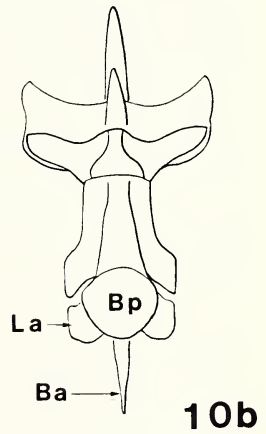
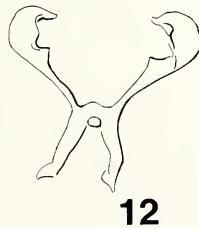
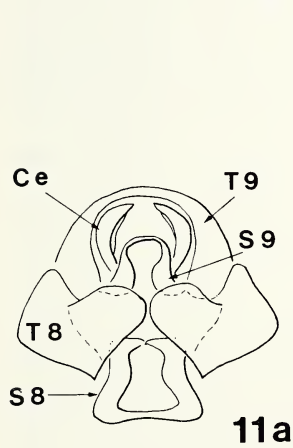
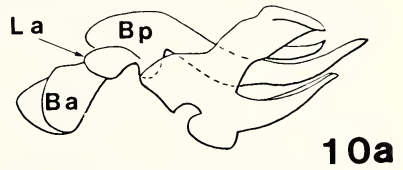
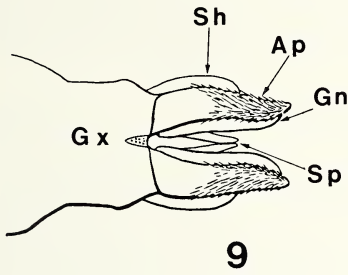
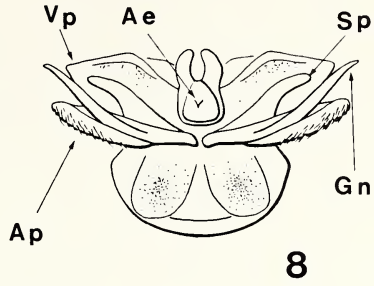
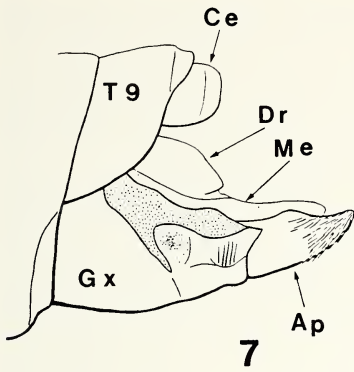
***Geron salmonus* Scarbrough and Davidson, new species**

Figs. 7-12

Diagnosis. *Geron salmonus* is recognized by its usual pinkish oral margins, basal antennal segment with mostly dark pile dorsally, 2nd antennal segment black pilose, apical ½ of each femur with abundant brownish scales and several stiff brown hairs; vertical plate of male genitalia with a long, strong spine; female with abundant frontal golden scales and brownish pile, vaginal apodeme with dorsal arms clavate.

Geron salmonus is similar to *G. farri*, new species but can be distinguished by its whitish frontal vestiture, presence of whitish pile ventrally on the basal antennal segment and the vertical plate with a long basal spine.

Description. Male holotype. Length 5.8 mm, ground color largely black, oral margin pinkish or salmon-colored. Gonocoxite reddish brown basally, shiny black apically. Femora dark brown to blackish, tibiae yellowish brown to brown with the midtibia lightest.



Figs. 7-12. Genitalia of *G. salmonus*; 7-10 male, 11, 12 female. 7. Closed condition, lateral view. 8. Expanded condition, apical view. 9. Closed condition, ventral view. 10. Aedeagus, lateral (a) and dorsal (b) views. 11. Ventral view (a) with lobe of tergite 8 (b) enlarged, showing setae on inner surface. 12. Vaginal apodeme.

Face, front and lower $\frac{1}{2}$ of occiput gray pollinose with white pile and silvery scales, front with scattered pale yellowish scales. Upper $\frac{1}{2}$ of occiput black pollinose with mostly white pile; dorsal postocular pile slightly yellowish. Ocellar tubercle with abundant blackish pile, a few golden scales posteriorly. First antennal segment with mostly dark pile dorsally, white ventrally; 2nd segment dark pilose. Antennal ratio 2.7:1.0:6.0, proboscis length 2.9 mm, front 0.4 mm at antennal base.

Scutum mostly black pollinose dorsally, gray anteriorly including 2 admedian stripes and laterally; posterior callus brownish gray pollinose. Anterior $\frac{1}{3}$ of scutum with mostly white pile and yellowish white scales; posterior two-thirds with scales curved and golden, pile shorter, less dense and blackish brown; posterior margin with scattered long yellow pile. Scutellum black pollinose with yellow pile and scattered golden scales, apical margin weakly brown pollinose. Pleuron gray pollinose with silvery scales and white pile, anepimeron and meron bare.

Coxae gray pollinose with white pile and silvery scales. Femora mostly white pilose and tomentose; apical $\frac{1}{2}$ of each femur with brownish scales anteriorly and several brownish hairs. Foretibia with brownish scales entirely, mid- and hindtibiae with brownish anteriorly and white scales posteriorly. Tibial spines black.

Wing 5.0 mm, hyaline, subcostal cell weakly yellowish. Veins brownish yellow; node of vein M slightly darker than surrounding veins; r-m crossvein at or slightly beyond middle of discal cell. Discal cell crossvein sinuous apically, stalk of anal cell about $\frac{1}{2}$ length of r-m crossvein. Squama whitish, fringe whitish pilose; costal vein with pale yellowish pile basally. Halter yellowish.

Abdomen black pollinose dorsally with traces of brown, gray laterally and ventrally, brown most apparent on posterior 4–5 segments. Abdomen mostly whitish pilose, posterior 3–4 segments with several stiff yellow and brownish to blackish hairs. Gonocoxite thinly pollinose basally with a row of pale yellowish to brownish hairs.

Genitalia (Figs. 7–10). Gonocoxite large, slightly convex in lateral view, basolateral membrane white and V-shaped; apical process with abundant pale yellowish pile. Vertical plate large, with a prominent basal spine, and connected to a whitish membrane or sheath dorsally. Dorsolateral ramus (“hypovalve” of Painter, 1932) of gonocoxite broadly joined to aedeagus, exposed below epandrium as an apically pointed sclerotized plate. Gonostylus slender, slightly shorter than apical process. Aedeagus broad basally and subtriangularly rounded, shaft broadly U-shaped, apex not noticeably exposed when genitalia are expanded. Aedeagal apodemes as in Figure 4.

Female allotype. Differs from male as follows: length 5.1 mm, wing 4.9 mm, proboscis 2.3 mm, antennal ratio 2.3:1.0:5.7. Front grayish to brown pollinose with abundant yellowish brown pile and mostly golden scales, silvery scales along eye margin and above antenna. Upper occiput brownish black pollinose with golden scales, abundant behind ocellar tubercle; postocular pile yellow, yellowish white posteriorly. Dorsum of thorax and abdomen with dense brownish pollen and pile, pile darker yellow than in male.

Genitalia (Figs. 11, 12). Tergite 8 with rounded lobes ventrally, inner margin with 5–6 evenly spaced setae. Sternite 8 rhomboid-shaped, middle membranous and bell-shaped, weakly spinous apically. Vaginal apodeme with dorsal arms clavate. Sternite 9 broad basally, narrow apically, extending between cerci.

Variation. Length ♂ 5.1 to 6.4 mm, ♀ 3.5 to 5.4 mm; wing ♂ 4.3 to 5.4 mm, ♀ 3.3 to 5.0 mm; proboscis ♂ 2.5 to 2.9 mm; ♀ 1.9 to 2.9 mm; front ♂ 0.4 to 0.5 mm; ♀ 0.3 to 0.4 mm; antennal ratio ♂ 2.7:1.0:5.3 to 2.7:1.0:6.7, ♀ 2.3:1.0:5.7 to 2.5:1.0:4.8. Oral margin usually pinkish, rarely whitish. Males usually have some pale yellowish scales on the front, rarely entirely silvery; golden scales are usually absent on the occiput. The brown pollen on the dorsum is usually in trace amounts only in males.

Type material. Holotype. ♂, San Salvador (Watlings) Island, Bahamas, scrub growth, 8.VI.1981, H. Oestreicher. Allotype. ♀, same location, 5.VI.1981, D. Davidson; both are in the U.S. National Museum, Washington, D.C. Paratypes 23♂♂, 22♀♀, same location as types, 2–15.VI.1978, 2.VI.1979, 3–5.VI.1980, 29.V–15.VI.1981, various collectors. Paratypes are in the U.S. National Museum; American Museum of Natural History, New York; Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts; Universitetets Zoologiske Museum, Copenhagen, Denmark; Entomological Museum, University of California, Riverside, California; and Museum of Zoology, Towson State University, Baltimore, Maryland.

Etymology. The specific name *salmonus* refers to the pinkish-colored oral margins.

Geron farri Scarbrough, new species

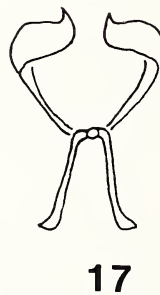
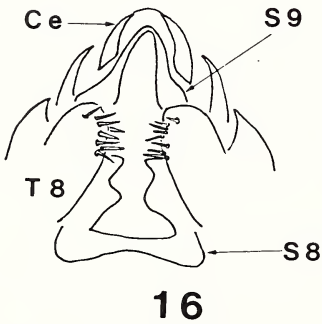
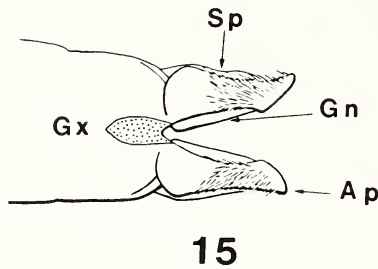
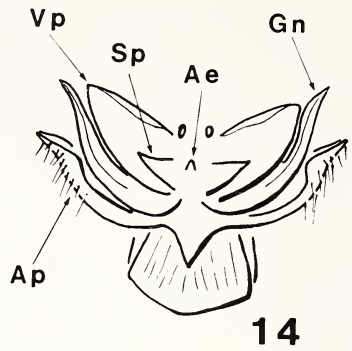
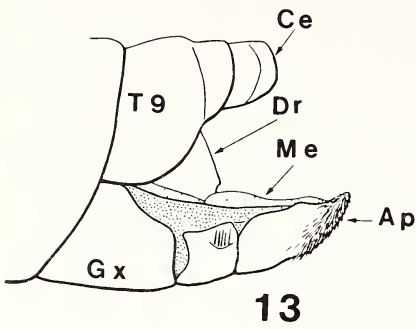
Figs. 13–17

Diagnosis. *Geron farri* is recognized by its white oral margin; basal 2 antennal segments with wholly dark pile (♂) or mostly yellow pile (♀) with several dorsoapical dark hairs; front with brown pile and golden to brownish scales; anterior and dorsal ½ or more of each femur apically with brownish scales and several brown hairs; apical 3–4 abdominal segments with numerous brown hairs; hindfemur reddish; vaginal apodeme of females with dorsal arms clavate, apical ¼ of apical gonocoxal process of males slightly projecting around apex of gonostylus; vertical plate with short basal spine.

Geron farri is similar to *G. salmonus*, new species but is readily identified by its brownish or yellowish antennal pile, the brownish to yellowish pile and tomentum of the front, the reddish hindfemur and detailed characters of the genitalia.

Description. Male holotype. Length 5.2 mm. Ground color dark brown to black, oral margin white; gonocoxite reddish brown basally, shiny brownish medially, brownish black to black laterally and apically. Femora, especially hindfemur, reddish to reddish brown; tibiae yellowish brown.

Face and lower ½ of occiput grayish pollinose with white pile and silvery scales, front with golden scales and brown pile, antennal pile brownish. Ocellar pile dark brown to golden brown, a few dorsal postocular hairs lighter brown. Upper ½ of occiput velvety black pollinose, brownish gray laterally above wings and on anepisternum, remaining pleuron and scutum grayish anteriorly, including 2 short admedian dorsal stripes. Anterior ⅓ of scutum with dense white pile and scattered white scales, posterior two-thirds with scattered golden scales and shorter, less dense, blackish pile; a few bristly yellowish hairs laterally above wings and along posterior margin. Scutellum with whitish pile dorsally, longer yellowish hairs along margin. Pleuron with white pile and scales, anepimeron and meron bare.



Figs. 13-17. Genitalia of *G. farri*; 13-15 male, 16, 17 female. 13. Closed condition, lateral view. 14. Partial expanded condition, apical view. 15. Closed condition, ventral view. 16. Ventral view. 17. Vaginal apodeme.

Coxae gray pollinose with white pile and silvery scales. Femora apically with abundant brownish scales on anterior and dorsal $\frac{1}{2}$ or more, whitish elsewhere; tibiae with mostly brownish scales, some brown scales intermixed with white. Femora with mostly white hairs; apical $\frac{1}{5}$ of each femur and anteroventral row of midfemur with brown hairs. Tibial spines brownish to black.

Wing 5.1 mm, sharply angular apically, hyaline, subcostal cell yellowish. Veins yellowish, node of vein M with a dark spot, r-m crossvein beyond middle of discal cell and about same length as anal stalk; vein between discal and 1st medial cells sinuous. Squama and fringe whitish. Costal vein with yellowish pile basally. Halter yellowish.

Abdomen with velvety black pollen and golden scales dorsally, gray pollinose with silvery scales ventrally; pile primarily pale yellowish dorsally and white ventrally; apical 3–4 segments with numerous brown to blackish bristly hairs. Gonocoxite thinly brown pollinose basally, with a row of pale yellowish hairs.

Genitalia (Figs. 13–15). Gonocoxite large, slightly convex in lateral view, with a wide T-shaped whitish membrane basolaterally, apical process with abundant brownish pile, apical $\frac{1}{4}$ with inner margin slightly angular and curved around apex of gonostylus; dorsolateral ramus broadly joined to aedeagus, apically subtruncate, often projecting as a wide sclerotized plate below epandrium. Gonostylus moderately thick basally, slender along most of its length, about as long as apical process. Median vertical plate with a short basal spine, about $\frac{1}{2}$ to $\frac{1}{3}$ length of apical process; dorsal margin sharply curved medially, attached to brownish sheath or membrane that covers and extends slightly beyond apical process laterally. Aedeagus almost identical to that of *G. salmonus*; basal point of aedeagus rhomboid, shaft strongly bent downward basally, aedeagus not noticeably projecting when genitalia are expanded.

Female allotype (Figs. 16, 17). Differs from male as follows: length 5.7 mm, proboscis 2.9 mm, front 0.5 mm, wing 5.6 mm, antennal ratio 2.5:1.0:6.5. Basal antennal segment mostly yellowish pilose, several dorsoapical hairs brownish. Front with mostly golden scales and brownish yellow to brown hairs, white scales bordering eyes near antenna. Upper $\frac{1}{2}$ of occiput with abundant golden scales and yellowish pile. Scutum and abdominal dorsum with abundant dark pile in addition to yellow. Tergite 8 with 8–9 irregularly spaced stiff setae; sternite 8 slightly rhomboid-shaped with a median bell-shaped membrane. Vaginal apodeme with dorsal arms flat and clavate.

Variation. δ length 3.7 to 5.2 mm, proboscis 2.0 to 3.0 mm, wing 3.6 to 5.0 mm, antennal ratio 2.9:1.0:5.0 to 3.2:1.0:6.0, front 0.4 to 0.5 mm. Squama and fringe sometimes yellowish and the anterior surface of the hindfemur usually has several brown hairs. The femora are usually reddish brown to reddish yellow.

Type material. Holotype, δ , Jamaica, B.W.I., St. Thomas, 4 mi woods, 15.VI.1954, T. H. Farr. Allotype η , Jamaica, Linguanea Plain, ?XI.1911, C. T. Brues. Paratypes. 2 $\delta\delta$, St. Thomas, 14 mi E Kingston on Mount Bay Rd., 28.V.1954, on *Croton humilis* L., T. H. Farr; δ , St. Andrew, Hermitage Dam, 30.V.1954, T. H. Farr; δ , Kingston, date ?, C. W. Johnston. The holotype and 3 paratypes are in the Museum of the Institute of Jamaica, Kingston. The allotype and 1 paratype are in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.

Etymology. *Geron farr* is named after T. H. Farr for his contributions to Jamaican dipterology.

***Geron exumae* Scarbrough, new species**
Figs. 18–22

Diagnosis. *Geron exumae* is recognized by its creamy white to yellowish oral margin; basal antennal segment mostly white to pale yellowish pilose, several brownish hairs dorsoapically, 2nd segment usually brown pilose; front with mostly whitish scales in males and golden scales in females; femora mostly with white scales and pile, forefemur with apical $\frac{1}{3}$ to $\frac{1}{2}$ brown tomentose; male with apical process short and narrow, dorsolateral ramus acutely angular apically, vertical plate with a short basal spine; and female with dorsal arm of vaginal apodeme flat and apically clavate.

Geron exumae is similar to *G. salmonus*, new species and *G. farri*, new species but is recognized by its usual smaller size, prominent white to yellowish antennal pile, and details of the male and female genitalia. In addition, *G. exumae* has a dark brown hindfemur whereas it is reddish in *G. farri*.

Description. Male holotype. Length 3.4 mm. Ground color dark brown to black; lower face, narrow borders of basal 2–3 abdominal segments and midtibia light brown to yellowish. Genitalia dark brown to black laterally, brown to yellowish brown ventrally. Oral margin white.

Face and lower $\frac{1}{2}$ of occiput gray pollinose with white pile and silvery scales, upper $\frac{1}{2}$ of occiput black pollinose with mostly whitish pile, that along eye margin and immediately behind ocellus yellowish. Ocellar tubercle yellowish pilose, a few brownish hairs dorsoapically, 2nd antennal segment dark brown pilose. Front 0.3 mm, proboscis 2.9 mm, antennal ratio 2.4:1.0:5.6.

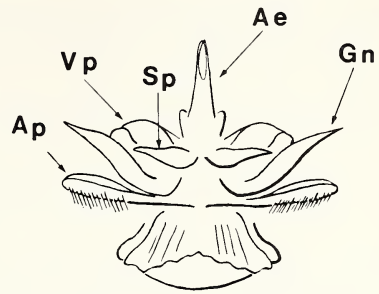
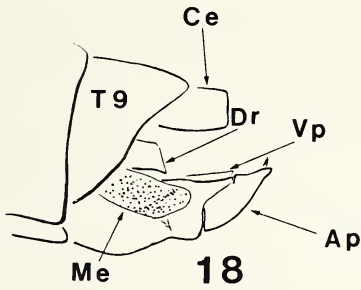
Scutum black pollinose dorsally with traces of brown; anterior margin, including corners and 2 admedian stripes gray; sides above wings brownish gray pollinose, postalar callus brown. Anterior $\frac{1}{3}$ of scutum with scattered silvery to pale yellowish white scales and abundant white pile, posterior two-thirds with abundant golden scales and mostly shorter, less dense, dark brown to blackish pile, some longer yellowish pile posteriorly; sides above wings and postalar callus with scattered yellow hairs. Scutellum black pollinose with scattered golden scales and yellow pile. Pleuron mostly gray pollinose with silvery scales and white pile; anepimeron and meron bare. Halter yellowish white.

Coxae gray pollinose with white pile and silvery scales. Femora with mostly white scales and white pile, apical $\frac{1}{3}$ to $\frac{1}{2}$ of forefemur with pale brown scales; each femur with 2–3 brown hairs apically. Tibiae with blackish spines and mostly whitish scales.

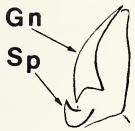
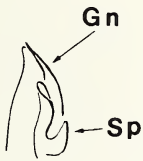
Wing 3.9 mm, with subcostal cell pale yellow, cells otherwise hyaline. Veins generally brownish, slightly yellowish basally, node of M vein with a small black spot; r-m crossvein slightly beyond middle of discal cell, about same length as anal stalk; vein between discal and 1st medial cells slightly sinuous. Base of costal vein with yellow pile; squama and fringe white.

Abdomen blackish pollinose dorsally with whitish pile and yellow to golden yellow scales, apical 2–3 segments with scattered yellowish hairs; gray to brownish gray pollinose ventrally with white pile and silvery scales.

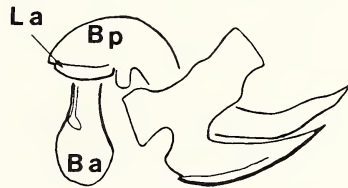
Genitalia (Figs. 18–20). Gonocoxite with whitish elliptical membrane basolaterally, apical process brownish pilose, subapically angular dorsally; dorsolateral ramus broadly joined in aedeagus, acutely angular apically. Gonostylus long, thick basally, slender



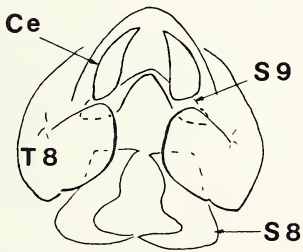
19a



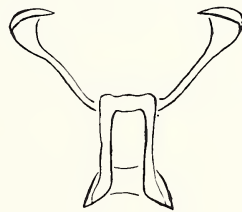
19b



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21



22

Figs. 18–22. Genitalia of *G. exumae*; 18–20 male, 21, 22 female. 18. Closed condition, lateral view. 19a, Expanded condition, apical view; 19b, dorsal (above) and ventral (below) views of gonocoxite. 22. Vaginal apodeme.

apically. Vertical plate thick, with a strong basal spine. Aedeagus long, clearly exposed when genitalia are expanded, basal point rhomboid, lateral apodeme somewhat evenly rounded, basal apodeme slightly enlarged apically with a slender club-shaped thickening.

Female allotype. Differs from male as follows: length 4.0 mm, wing 3.9 mm, front 0.4 mm, proboscis 2.1 mm, antennal ratio 2.0:1.0:6.0. Oral margin yellowish white. Front mostly brownish pollinose with abundant golden scales and yellow to brownish yellow pile, silvery scales along eye margin below. Dorsal $\frac{1}{2}$ of occiput, scutum, and tergites weakly brownish pollinose with abundant golden scales and yellow pile. Apical 3 tergites with scattered brownish hairs. Halter yellow.

Genitalia (Figs. 21, 22). Lobes of tergite 8 longer than wide, with 5–6 setae in a row. Sternite 8 rhomboid, weakly spinose apically, membrane bell-shaped. Dorsal arms of vaginal apodeme, flat, weakly capitate. Cercus apically truncate, with 2 alate plates basally.

Variation. Length δ 2.8 to 4.5 mm, ♀ 2.5 to 4.6 mm; wing δ 2.5 to 4.4 mm, ♀ 2.6 to 4.4 mm; proboscis δ 1.7 to 3.0 mm, ♀ 1.6 to 2.8 mm; front δ and ♀ 0.2 to 0.3 mm; antennal ratio δ 2.0:1.0:6.0 to 3.3:1.0:6.6, ♀ 2.0:1.0:5.5 to 2.0:1.0:6.6. Oral margin usually creamy white although old or greased specimens are yellow. Basal antennal segment usually has slightly yellowish pile dorsally, with a few to several brownish hairs apically. One female has several yellow hairs on the 2nd antennal segment.

Type material. Holotype. δ , Bahamas, Great Exuma Island, Simon Pt., 23.I.1982, T. McCabe. Allotype ♀ , same data. Paratypes. 2 $\delta\delta$, 2 ♀♀ , 15–17.I.1982, same location and collector as types; Staniel Cay, Exuma, 3 $\delta\delta$, 6 ♀♀ , 25.IV.1981, C. A. Toft; Eleuthera Island, New Portsmouth, 3 $\delta\delta$, 5 ♀♀ , 28.III.1953, E. B. Haydes; Long Island, Deadman's Cay, 3.III.1953, E. B. Haydes; Cuba, δ Soledad, ?VIII.?, Davenport; Soledad, Santa Clara Prov., 2 $\delta\delta$, 4 ♀♀ , 24–30.VI–VIII.1939, C. T. Brues; Same data, 4 $\delta\delta$, 2 ♀♀ , 20–25.II.1925.

The holotype and allotype are in the State Museum of New York, Albany. The paratypes are in the Albany Museum; Museum of Zoology, University of California, Davis; Museum of Comparative Zoology, Cambridge, Massachusetts; and the American Museum of Natural History, New York.

Etymology. This species is named after the Bahamian Island on which the fly was collected.

Distribution. Bahama Islands and Cuba. The seasonal distribution ranges from January through August.

***Geron binatus* Scarbrough, new species**

Figs. 23–25

Diagnosis. *Geron binatus* is recognized by its white oral margin, a large whitish triangle on the lower face; 1st antennal segment with mostly dark pile dorsally, 2nd antennal segment with black pile entirely, frontal pile yellow to brownish, apical 3 abdominal segments and cercus with abundant yellow and brownish black stiff hairs, apices of each femur with numerous brownish scales and several stiff brown hairs; gonocoxite deeply bilobed medially, each branch with 5 spatulate fingers; apical process of gonocoxite brown pilose, flattened dorsoventrally, and blade-like in outline

ventrally; vertical process and gonostylus fused, broad and thick basally, slightly longer than apical process; aedeagus almost straight, the apex concealed by an apically acute apodeme laterally.

Geron binatus is quite different from any other known *Geron* species in the Caribbean region, and is easily recognized by the characters of the head and details of the male genitalia.

Description. Male holotype. Length 6.3 mm. Ground color dark brown to black. Oral margin and large triangular area of lower face white. Tibia brown. Gonocoxite yellowish basally, shiny dark brown apically.

Face, front and lower $\frac{1}{2}$ of upper occiput grayish pollinose with white pile and silvery scales, upper $\frac{1}{2}$ of occiput blackish with pale yellow hairs, postocular pile and ocellar hairs blackish. Frontal pile yellowish to brownish, scales whitish to slightly yellowish. Second antennal segment with pile entirely black; 1st segment mostly dark pilose dorsally. Proboscis 3.0 mm, front 0.5 mm, antennal ratio 2.5:1.0:5.0.

Scutum and scutellum blackish pollinose with yellow to golden scales dorsally. Scutum weakly gray pollinose anteriorly, including 2 admedian stripes, with whitish pile; sides above wings, including postalar callus, brownish pollinose; posterior two-thirds of scutum with scattered brownish to blackish hairs, a few stiff hairs laterally and posteriorly. Scutellum yellow pilose. Pleuron grayish pollinose with white pile and silvery scales; anepimeron and meron bare.

Coxae grayish pollinose, with white scales and pile. Femora with mostly white scales and pile, apical $\frac{1}{3}$ or more of each femur with brownish scales and several yellowish brown to brown hairs; tibiae with brownish and white scales intermixed; hindtibia with brownish scales more abundant.

Wing 4.1 mm, hyaline, subcostal cell slightly yellowish, veins slightly brownish, yellowish basally. R-m crossvein beyond middle of discal cell and slightly shorter than anal stalk; crossvein between discal and 1st medial cells sinuous. Pile of costa basally and fringe white, squamata white. Halter yellow.

Abdomen mostly black pollinose dorsally, with whitish pile and yellow scales, mostly grayish ventrally with whitish pile and silvery scales. Posterior 3 segments and cercus slightly brownish pollinose with abundant blackish brown and yellow hairs. Gonocoxite brownish pollinose with several stiff yellow hairs, deeply bilobed medially, apex of each branch with 5 small spatulate fingers.

Genitalia (Figs. 23–25). Gonocoxite with asymmetrical pyriform membrane basolaterally, apical process brown pilose, flattened dorsoventrally, apex narrowed, slightly curved laterally, blade-like in ventral view. Dorsal ramus narrowly connected to aedeagus, exposed below epandrium as a truncate plate. Gonostylus and vertical plate fused, thick basally, tapered apically, slightly longer than apical process. Aedeagus almost straight, basal point rounded, rhomboid-shaped; lateral apodeme slightly wider than long, basal apodeme rounded apically. Tip of aedeagus not noticeably exposed, concealed laterally by apically acute apodeme.

Female unknown.

Type material. Holotype. ♂, St. Johns, Antigua, 2–3.II.1965, H. E. Evans. The holotype is in the U.S. National Museum, Washington, D.C.

Etymology. The name *binatus* refers to the division of the gonocoxite into two branches.

***Geron declinatus* Scarbrough, new species**

Figs. 26-28

Diagnosis. *Geron declinatus* is recognized by its white oral margin, basal antennal segment entirely whitish pilose, 2nd segment black pilose, frontal pile and scales whitish, abdomen mostly white pilose, apical 3 segments and cercus with scattered yellow pile; male genitalia with apical process, gonostylus and vertical plate unusually slender and weak; aedeagus abruptly curved downward before basal point, apex not noticeably exposed when genitalia are expanded.

Geron declinatus is similar to *G. senilis* in that the basal antennal segment is entirely white pilose, which separates these species from the remaining Caribbean species. However, *G. declinatus* differs in that the 2nd antennal segment is wholly black pilose. The pile is entirely white on this segment in *G. senilis*.

Description. Male holotype. Length 5.1 mm. Ground color largely black. Oral margin white. Femora dark brown, tibiae brownish. Gonocoxite brownish basally, shiny dark brown apically.

Face, front and lower $\frac{1}{2}$ of occiput grayish pollinose with white pile and silvery scales, upper $\frac{1}{2}$ of occiput blackish pollinose with dull white pile; pile along eye margin slightly yellowish. Ocellar pile brown. Frontal pile white, scales mostly whitish, a few slightly yellowish. Second antennal segment wholly black pilose, 1st segment white pilose entirely. Proboscis length 2.3 mm, front 0.4 mm, antennal ratio 2.5:1.0:6.5.

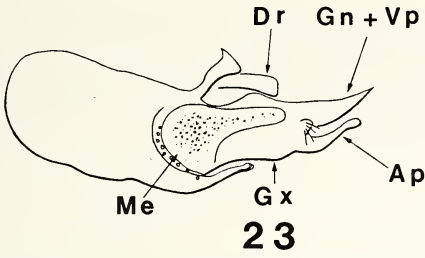
Scutum and scutellum mostly blackish pollinose with scattered yellow to golden scales. Scutum weakly gray pollinose anteriorly and laterally, including 2 admedian stripes. Pile whitish, dense anteriorly, posterior two-thirds of scutum with mostly scattered brownish to blackish pile, a few stiff yellow hairs laterally above wings, on postalar callus and along posterior margin. Scutellum yellow pilose. Pleuron grayish pollinose with white pile and silvery scales, anepimeron and meron bare.

Coxae grayish pollinose with white pile and scales. Femora with mostly white scales and pile, apical $\frac{1}{3}$ of forefemur with pale yellowish or brownish scales. Tibiae with black spines, scales whitish.

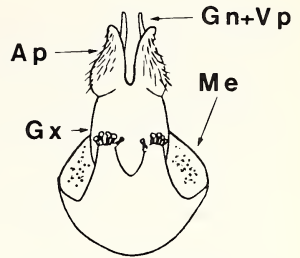
Wing 5.2 mm, hyaline, subcostal cell weakly yellowish; vein slightly brownish apically, yellowish basally. R-m crossvein beyond middle of discal cell, slightly shorter than anal stalk; apical crossvein of discal cell slightly sinuous. Squama and fringe pile white. Costal vein with white pile basally. Halter creamy white.

Abdomen blackish pollinose dorsally with mostly white pile, apical 3 segments and cercus with scattered yellow pile, grayish pollinose ventrally with white pile and silvery scales.

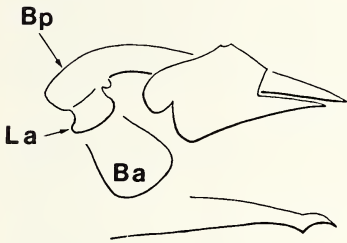
Genitalia (Figs. 26-28). Gonocoxite linear with whitish basolateral membrane, apical process slender, about as long and wide as, or slightly larger than vertical plate, with brownish to yellowish pile. Dorsal ramus narrowly joined to aedeagus, anterior branch exposed as a folded plate (ca. 90°) below epandrium. Gonostylus and vertical plate unusually slender and weak, the former dagger-like, slightly shorter than apical process, plate decurved strongly when genitalia are expanded, with a weak basal spine. Aedeagus sharply curved downward before basal point, the latter rounded, rhomboid-shaped, lateral apodeme slightly wider than long. Apex of aedeagus short, not noticeably exposed when genitalia are expanded.



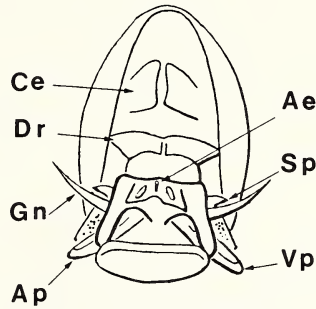
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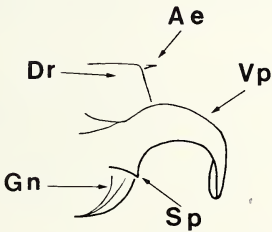
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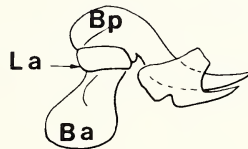
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27



28

Figs. 23–28. 23–25. Male genitalia of *G. binatus*. 23. Closed condition, dissected, lateral view. 24. Closed condition, ventral view. 25. Lateral view of aedeagus (a) with an enlarged lateral apodeme (b) dissected. 26–28. Male genitalia of *G. declinatus*. 26. Expanded condition, apical view. 27. Gonostylus and vertical plate, expanded condition, lateral view. 28. Aedeagus, lateral view.

Female unknown.

Type material. Holotype. ♂, St. Johns, Antigua Island, 2-3.II.1965, H. E. Evans. The holotype is in the U.S. National Museum, Washington, D.C.

Etymology. The name *declinatus* refers to the strongly decurved shape of the vertical plate when the genitalia are expanded.

***Geron articulatus* Scarbrough, new species**

Figs. 29-31

Diagnosis. *Geron articulatus* is recognized by its whitish oral margin, basal antennal segment with mostly whitish pile, mostly brownish pile dorsally, 2nd antennal segment brown pilose, frontal pile and scales white, abdominal tergites yellowish pilose dorsally, apical 1/2 of hindfemur with numerous brown hairs, gonostylus short and articulated near apex of vertical plate; vertical plate short with basal spine small.

Geron articulatus is similar to *G. exumae*, new species in general appearance but is readily recognized by the usual abundant dark pile on the basal antennal segment dorsally and by the detailed characters of the male genitalia.

Description. Male holotype. Length 5.3 mm, ground color largely dark brown to black, oral margin whitish, femora dark brown, tibiae and sides of 1st tergite yellowish brown.

Face, front and lower 1/2 of occiput grayish pollinose with whitish pile and silvery scales, upper 1/2 of occiput slightly brownish black pollinose with dull white pile. Ocellar tubercle with brownish pile, pale yellowish scales scattered posteriorly. Antenna with 2nd segment brown pilose, basal segment mostly whitish pilose, brownish dorsally. Antennal ratio 2.4:1.0:?, proboscis 2.9 mm, front 0.4 mm at antennal base.

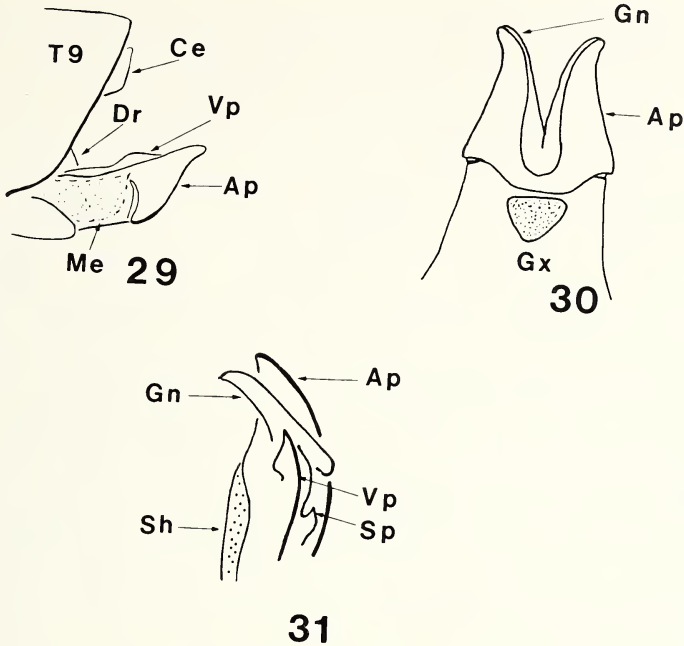
Scutum mostly and scutellum entirely brownish black pollinose, anterior margin of scutum including 2 admedian stripes and entire pleuron grayish. Scutum with mostly scattered blackish brown pile and golden scales; pile yellowish laterally and posteriorly, anterior margin with whitish pile and scattered whitish scales. Scutellum with yellow pile and golden scales. Pleuron with silvery scales and white pile; meron and anepimeron bare. Halter creamy white.

Coxae gray pollinose with white pile and silvery scales. Femora with whitish scales and whitish pile, apical 1/4 or more of each femur with brown scales dorsally, apical 1/2 of hindfemur with numerous brown hairs. Tibiae with mostly white scales dorsally, hindtibia with brown and white scales mixed dorsally. Tibial spines brownish.

Wing 5.1 mm, hyaline, subcostal cell yellowish. Veins yellowish to yellowish brown, node of vein M with dark spot, vein between discal and 1st medial cells sinuous. Anal stalk slightly shorter than r-m crossvein, the latter beyond middle of discal cell. Costal vein with yellow pile basally, squama yellowish, fringe white.

Abdomen brownish black pollinose dorsally with golden scales and yellow pile gray pollinose ventrally with white pile and silvery scales.

Genitalia (Figs. 29-31). Gonocoxite elongate, basolateral membrane brownish, a small oval or triangular whitish membrane medioventrally; apical process somewhat triangular in lateral view with brown pile; dorsolateral ramus broadly connected to aedeagus. Vertical plate somewhat short, with brown membranous depression medially and a small spine basally. Gonostylus shorter than apical process, strong,



Figs. 29–31. Male genitalia of *G. articulatus*. 29. Closed condition, lateral view. 30. Closed condition, ventral view. 31. Dorsal view showing apical process, gonostylus and vertical plate, dissected.

slightly tapered unilaterally, articulated near apex of vertical plate. Aedeagus slender, slightly undulate, basal point rhomboid, lateral apodeme length twice its width.

Female unknown.

Type material. Holotype. ♂, Palo Verde Monte Cristy en fin cadela Nebrasco, 4.III.1967, Todo en Sorgo, Marcano F. The holotype is in the U.S. National Museum, Washington, D.C.

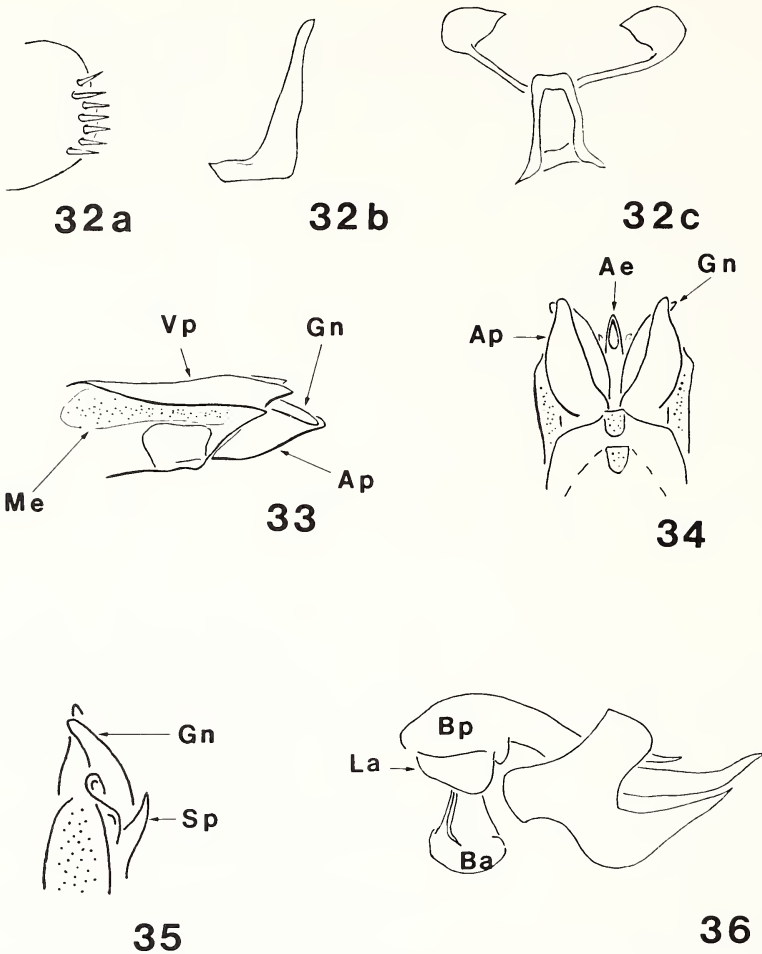
Etymology. The name *articulatus* refers to the union of the gonostylus with the genitalia.

***Geron nephroideus* Scarbrough, new species**

Figs. 32–36

Diagnosis. *Geron nephroideus* is recognized by its yellowish oral margin; basal antennal segment with yellowish to yellowish white pile dorsally, white ventrally; costal vein with basal pile white; veins of wing yellowish; male with dull white occipital, thoracic and abdominal pile, unusually long and dense on entire thoracic dorsum; aedeagus length subequal to apical process; female with dorsal arms of vaginal apodeme strongly capitate or kidney-shaped apically.

Geron nephroideus is similar to *G. exumae*, new species and *G. salmonus*, new



Figs. 32–36. Genitalia of *G. nephroideus*; 32 female, 33–36 male. 32. Lobe of tergite 8 (a), sternite 9 (b) and vaginal apodeme (c). 33. Closed condition, lateral view, tergite 9 and cercus removed. 34. Closed condition, ventral view. 35. Gonocoxite and gonostylus, dorsal view. 36. Aedeagus.

species but is easily separated from these species by the characters listed in the diagnosis.

Description. Female holotype. Length 6.6 mm. Ground color generally blackish, oral margin yellowish, femora dark brown, foretibia brown, mid- and hindtibiae yellowish brown.

Head generally gray pollinose, upper 1/2 of occiput blackish. Face and lower 1/2 of occiput with white pile and silvery scales, front with abundant golden scales and yellow pile, silvery scales along eye margin and just above antenna. Dorsal 1/2 of

occiput with abundant golden scales and yellow pile. Ocellus yellow pilose. Basal antennal segment with yellowish pile dorsally, white ventrally, 2nd segment yellowish and white intermixed dorsally, pale yellow to white ventrally. Front 0.5 mm at antennal base, proboscis 3.6 mm, antennal ratio 2.8:1.0:6.8.

Scutum mostly and scutellum entirely blackish pollinose with yellow scales and mostly yellowish pile, scattered brownish black pile on posterior two-thirds. Scutum anteriorly, including 2 admedian stripes, and pleuron grayish, the latter white pilose with silvery scales; anepimeron and meron bare.

Legs mostly white pilose with white scales, anterior $\frac{1}{3}$ to $\frac{1}{2}$ of forefemur with brownish scales. Tibiae with brown spines.

Wing 6.1 mm, hyaline, veins yellowish, r-m crossvein beyond middle of discal cell, slightly longer than anal stalk; crossvein between discal and 1st medial cells strongly sinuous. Squama and fringe white. Costal vein with basal pile whitish.

Abdomen brownish black pollinose dorsally with yellowish pile and scales, gray pollinose ventrally with white pile and silvery scales.

Genitalia (Fig. 32). Tergite 8 with lobes longer than wide and a subapical row of 7-8 strong setae on inner margin. Cercus subtruncate, with a pair of long, slender plates, basal width less than length. Sternite 8 typically rhomboid, weakly spinose apically, with bell-shaped membrane. Vaginal apodeme with dorsal arms slender, abruptly enlarged apically, strongly bean- or kidney-shaped.

Male allotype. Differs from female as follows: length 7.6 mm, front 0.5 mm, proboscis 3.0 mm, wing 6.9 mm, antennal ratio 2.4:1.0:7.0. Pile generally dull white, slightly longer than usual and unusually dense, especially on posterior two-thirds of scutum. Basal antennal segment yellowish white to white entirely, 2nd antennal segment with mostly yellowish white pile, scattered yellowish brown pile dorsally. Scales of scutum and abdomen whitish.

Genitalia (Figs. 33-36). Gonocoxite with elongate basolateral membrane, apical process yellowish pilose, inner margin slightly flared subapically and curved below gonostylus; vertical plate prominent, apically pointed and with a strong basal spine. Dorsolateral ramus of gonocoxite broadly joined to aedeagus. Aedeagus long, length subequal to apical process when genitalia are closed; basal point suboval, basal apodeme club-shaped apically, lateral apodeme alate.

Type material. Holotype. ♀, Cuba, Poey on green label, date ?, Loew. Allotype, ♂ (damaged), same data. Both specimens are in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.

Etymology. The name *nephriodeus* refers to the bean- or kidney-shape of the dorsal arms of the vaginal apodeme in the female.

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